Unsteady Flow and Sediment Transport Simulation Model for Dam Break Analysis

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The major goal of this project is to create an unsteady flow routing model that also models sediment transport and channel morphologic changes. In addition, the goal is to apply the concept of minimum energy dissipation rate to unsteady, mobile-bed hydrodynamics. There are steady flow models (i.e., GSTARS2.0), but these models cannot fully simulate unsteady flow.

The specific objectives of this project are:

1. Development of the unsteady total load sediment routing component of the model.
2. Development of the unsteady flow routing model that can model super- and sub-critical flow. This also includes the ability to model tributaries and flood plains.
3. Implementation of the minimum energy dissipation rate theory to calculate changes in channel morphology.

This year, a working model has been developed that can model unsteady mobile-bed hydrodynamics. However, the model does not yet have the ability to incorporate the minimum energy dissipation rate theory to calculate the changes in channel morphology. This ability will be added in the next stage of the research.

Greimann, B., and C. T. Yang. Total Load Modeling of Sediment Transport. Abstract submitted to IAHR Hydroinformatics 2000 Conference in Iowa City, Iowa.